Amendment to the Claims:

This listing of claims replaces all prior versions, and listings, of claims in the application:

1. (Currently amended) A method ~~of performing finite element analysis on~~ of for modeling a shell ~~including~~ comprising:

~~modeling a~~ an initial undeformed geometry of the shell as a mesh, ~~characterizing an environment for the shell, including~~ determining environmental factors affecting the mechanical behavior of ~~a modeled~~ the shell;

computing a mechanical response of the shell modeled as a set of ~~partial~~ linear differential equations representing at least both of: 1) a strain energy density per unit area; and 2) an external forcing vector, at least one of [[which]] said linear differential equations having a fourth order differential operator, taking into account said environmental factors ~~a characterized environment~~, using a finite element analysis to compute a deformed geometry of the surface, wherein the finite element analysis uses smooth subdivision basis functions as shape functions, said computing forming the subdivision basis functions by subdividing the mesh, and recomputing vertex positions of the mesh as a weighted average of several neighboring vertex positions; and

outputting a description of the deformed geometry of the modeled shell as determined from the computed mechanical response.

2. (Original) The method of claim 1, wherein the environment factors includes loading conditions, material properties, and boundary conditions for the modeled shell.

3. (Original) The method of claim 2, wherein the loading conditions includes an indication of applied forces.

4. (Original) The method of claim 2, wherein the loading conditions includes an indication of thermal loading.

5. (Original) The method of claim 1, further including outputting indications of the characterized environment.

6 - 8. (Cancelled)

9. (Currently Amended) A system ~~for performing finite element analysis on~~ of modeling a shell ~~including~~ comprising:

(a) means for ~~modeling the~~ forming an initial undeformed geometry of the shell as a mesh;

(b) means for ~~characterizing an environment for the shell, including~~ determining environmental factors affecting the mechanical behavior of the ~~modeled~~ shell;

(c) means for computing the mechanical response of the modeled shell as a set of linear differential equations representing at least both of: 1) a strain energy density per unit area; and 2) an external forcing vector, at least one of [[which]] said differential equations having a fourth order differential operator, taking into account said environmental factors ~~the characterized environment~~, using a finite element analysis with smooth subdivision basis functions as shape functions, where computing means determines the subdivision basis functions by recomputing vertex positions of the mesh as a weighted average of several neighboring vertex positions; and

(d) means for outputting a description of the geometry of the modeled shell as determined from the computed mechanical response.

10. (Original) The system of claim 9, wherein the environment factors includes loading conditions, material properties, and boundary conditions for the modeled shell.

11. (Original) The system of claim 10, wherein the loading conditions includes an indication of applied forces.

12. (Original) The system of claim 10, wherein the loading conditions includes an indication of thermal loading.

13. (Original) The system of claim 9, further including means for outputting indications of the characterized environment.

14 - 15. (Cancelled)

16. (Currently Amended) A system for performing finite element analysis using subdivision basis functions, including:

(a) means for inputting a mesh comprising a set of data points each having connectivity to neighboring data points, the mesh defining physical parameters;

(b) means for specifying an initial state for the mesh;

(c) means for defining a set of linear differential equations comprising a stiffness matrix and an external forcing vector, at least one such equation having a fourth order differential operator;

(d) means for solving the set of linear equations as applied to the mesh;

(e) means for outputting the solution to the set of equations as defining a modification of the initial state of the mesh based on the stiffness matrix and in response to the external forcing vector and which comprises a complete solution to the set of fourth order equations without relaxing continuity requirements of shape function or slope.

17. (Previously presented) A computer program, residing on a computer-readable medium, for performing finite element analysis on a shell, the computer program comprising instructions for causing a computer to:

(a) model ~~the~~ an initial undeformed geometry of the shell;

(b) characterize an environment for the shell, including environmental factors affecting the mechanical behavior of the modeled shell;

(c) compute the mechanical response of the modeled shell, as a set of [[partial]] linear differential equations, representing at least both of: 1) a strain energy density per unit area; and 2) an external forcing vector, at least one of [[which]] said linear differential equations having a fourth order differential operator, said compute taking into account

the characterized environment, and using a finite element analysis wherein the finite element analysis uses smooth subdivision basis functions as shape functions, where the compute determines the subdivision basis functions by subdividing the shell into a mesh, and recomputing vertex positions of the mesh as a weighted average of several neighboring vertex positions; and

(d) output a description of the geometry of the modeled shell as determined from the computed mechanical response.

18. (Original) The computer program of claim 17, wherein the environment factors includes loading conditions, material properties, and boundary conditions for the modeled shell.

19. (Original) The computer program of claim 18, wherein the loading conditions includes an indication of applied forces.

20. (Original) The computer program of claim 18, wherein the loading conditions includes an indication of thermal loading.

21. (Original) The computer program of claim 17, further including instructions for causing the computer to output indications of the characterized environment.

22-26. (Canceled)

Kindly add the following new claims:

27. (New) A method as in claim 1, wherein said external forcing vector defines applied loads on the shell of the unit normal to only a middle surface of the shell.

28. (New) A system as in claim 9, wherein said computing means comprises means for defining a limit surface during the finite element analysis, where the limit surface is constructed through repeated refinement and the associated refinement operator has a single eigenvalue of one, and a plurality of other eigenvalues of modulo smaller than one, and using said limit surface to determine said forcing vector.

29. (New) A system as in claim 9, wherein said external forcing vector defines applied loads on the shell of the unit normal to only a middle surface of the shell.

30. (New) A program as in claim 17, wherein said compute comprises defining a limit surface during the finite element analysis, where the limit surface is constructed through repeated refinement and the associated refinement operator has a single eigenvalue of one, and a plurality of other eigenvalues of modulo smaller than one, and using said limit surface to determine said forcing vector.

31. (New) A program as in claim 17, wherein said external forcing vector defines applied loads on the shell of the unit normal to only a middle surface of the shell.

32. (New) A method as in claim 1, wherein said computing comprises defining a limit surface during the finite element analysis, where the limit surface is constructed through repeated refinement and the associated refinement operator has a single eigenvalue of one, and a plurality of other eigenvalues of modulo smaller than one, and using said limit surface to determine said forcing vector.